From Classroom Learning to E-learning: An Actor-Network Perspective

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***Abstract*- This study examines the implementation of a learning management system (LMS) to support education of Norwegian athletic judges. The association that represents these judges (FDU) is the highest authority as regards authorization and control of sport judgers, and their operation is mainly based upon voluntary work. The athletic sport is getting increasingly popular, and there is a need to recruit more judges to be able to carry out athletics meetings. By offering courses online, the FDU hopes to reach and recruit new judges. The paper reports challenges, requirements and opportunities encountered while developing and deploying this LMS. We utilize an actor-network perspective to describe the complex socio-technical environment which unfolds while transferring from an offline to an online learning context.**

***Keywords*- Classroom learning, E-learning, LMS, Education of Athletic Judges, Actor-Network-Theory**

I. INTRODUCTION

Advances in information and communication technologies (ICT) have provided new opportunities in the education world. Recently, there has been a big focus from Higher Education to move from the Traditional Classroom to an online Learning Environment [1]. Several benefits have been clearly identified [2, 3]. For example online learning or e-learning provides flexible learning alternatives compared to traditional classroom learning such as the possibility for the learner to gain knowledge at their own pace without being constrained by location or time. However, the transition from a traditional classroom to a full exploitation of an online learning platform is considered as a daunting and challenging phase. Still, there is a plethora of research works focusing on the benefits of e-learning approaches verse the traditional Classroom [4-6]. Most of these studies are conducted in the context of Higher Education [2], and limited research has been done in private or public teaching settings which focus on lifelong training or vocational education [7]. This is even more valid for sport organization focusing on educating Judges. For instance, the Norwegian Athletic Judges association (FDU) aims at improving the sport judging. It is well recognized that Judge's technical skill or ability are subject to errors or differences, therefore there is a stringent need to enhance the educational environment [8]. Some recent studies claim that e-learning system could significantly improve the Judging accuracy. [9]. However, most of papers do not sufficiently discuss the challenges and requirements encountered when a sport institution is deciding to implement and/or deploy a LMS. Thus, this paper aims to bridge this research gap.

FDU is a part of the Norwegian Confederation of Athletics (NFIF) and its operation is mainly based upon voluntary

work. Athletic sport is getting increasingly popular leading to growing number of athletes and event organizations. In consequence, it is important to provide efficient mechanisms to train voluntary people to acquire the necessary skills and ability to score athletic performances during sport events. An e-learning system is considered as an interesting approach to train more people to acquire judging ability and in a shorter time.

This study intends to investigate closely the challenges, requirements and opportunities encountered while developing and deploying a LMS supporting the education of athletic Judges. We utilize actor network theory (ANT) to describe the complex socio-technical environment which unfolds while transferring from an offline to an online learning context for education of athletic judges.

The paper is organized as follows. The second part discusses the concepts surrounding the LMS, and ANT. The third part introduces the research context and presents the gained experience and challenges while developing and implementing a dedicated LMS.

II. FROM TRADITIONAL CLASSROOM TO E-LEARNING

Although, it is recognized that traditional classrooms often provide a learning style more suitable for learners who better learn by listening to a lecture, LMS have been adopted by several educational institutions in order to cope with stringent requirements for faster and more flexible education and higher pedagogical quality [10].

Research investigations clearly outlines that developing a LMS to support learning activity is the backbone of many academic institutions but not necessary in training institutions that provide lifelong education or vocational training. Several invoked reasons are related to the cost of developing such LMS or the lack of adequate competences in such institutions and so forth. Therefore, the transition from traditional classroom to an E-learning environment requires analysis of the opportunities, challenges and return of Investment [11].

Today, there are many online learning platforms competing in the market. These online platforms are often conceptualized as LMS; technically consisting of different e-learning tools that are integrated and accessed through a shared administrative interface [11]. A LMS encompasses several asynchronous and synchronous communication functions such as repository storage of documents and content, discussion boards, chats and video meetings [12]. Examples of LMS are Fronter, Blackboard, Moodle, and WebCT [13].

In this paper, we focus on the free Web application Moodle (Modular Object-Oriented Dynamic Learning Environment). Moodle has a large and diverse user community with over 50,000 users registered on this site alone, speaking 60 languages in 120 countries. Moodle is considered as being the leading open source LMS. This LMS provides features that help instructors to create easily effective online learning sites [14]. However, its implementation within a Norwegian sport education federation raised numerous issues.

The aim of this e-learning project is to transfer the learning context from traditional classroom courses into an online learning context. We utilize concepts from ANT to interpret the design and implementation process unfolding during this socio-technical project context.

The design or implementation of an e-learning system and more specifically the transition from traditional classroom to online learning context requires a deep understanding of the socio-technical factors that could facilitate of hamper this transition. These factors are related to potential conflicts, ICT artifact creation, attitude communication, relationship and so on. It is as well important to grasp the interaction between human and technology. An e-

learning system should be considered as a complex Socio-Technical system. ANT draws on this type of systems [15].

ANT approach focuses on inanimate entities such as technology and their effect on social processes. An actor is seen as a source of action independently of his status as human or not. An actor is only involved with others actors in an action within a specific constellation. Therefore, ANT disregards the idea that technology impacts on humans as external force. ANT is rather perceived as a concept emphasizing that Technology emerged rather from social, economical or professional interests and that it has the potential to shape social interactions [16] .

ANT consists of network including humans, things, ideas, and concepts that are referred to as "actors" or "actants" in the network. ANT approach is based on the draw of relationship between actors defined as well as network components [16]. ANT aims to investigate how networks are created or fall apart, how actors are enrolled and to trace how associations are taking place within these networks. Stability of network is as well analyzed, and might reach an unstable status if an actor is added or removed. Therefore, the functioning of the whole network should be carefully investigated. This is one of the purposes of ANT, which also creates the complexity of this approach since a network is constantly evolving while social reality is creating different conditions. Moreover, the ANT researcher should explore how local networks are ordered and re-configured over time [17].

Intermediaries and mediators can form relationships between actors. ANT presumes that the social world is encompassed by several mediators impacting in an unpredictable way on social outcomes and by few intermediaries.

ANT is increasingly influential, but according to Cresswell [15], this perspective is still a deeply contested approach to understand humans and their interactions with inanimate objects [15]. However, Mlitwa argues that this approach support the critical view of technology as a social and culturally embedded actor in a socio-technical network [18].

III. AN E-LEARNING SYSTEM FOR EDUCATING SPORT JUDGES

This study examines the implementation of a learning management system supporting education of Norwegian athletic judges (FDU). The federation is a part of the Norwegian Confederation of Athletics (NFIF) and its operation is mainly based upon voluntary work. The FDU represents the highest authority as regards authorization and control of judgers and starters. The federation is responsible for development of classes and curriculums for judges and starters as well as maintaining and developing the course material for teaching this kind of education. The athletic sport is getting increasingly popular, and the number of athletes is expanding. Consequently, there is a need to recruit new judges and starters to athletics meetings. Since judging is mainly unpaid work, it is not always easy to attract new people to do this important task.

FDU has for several years put effort into developing an e-learning context to educate judges. Different actors with different interests, however, have been involved in the project, but the project has suffered from a lack of continuation. In year 2010, several of the local clubs and their members expressed positive interest for the e-learning idea and FDU and NFIF decided to contact students involved in system development studies to assist and speed up the project.

A project was set up and representatives from five different organizations participated in the project; these included members of NFIF (management), FDU (management) Company IT (pseudonym – an IT consulting company), the IT department of Norwegian Confederation of Sports (NIF IT), and finally one system developer from the University of Agder (UiA), Norway. The latter participant

was responsible for organizing the project including deployment of content (information and multimedia content) into the open source learning management system (LMS), Moodle. Adobe Captivate was applied to generate user interfaces and for integrating content and customizing the LMS for the e-learning courses. In addition, Captivate was applied for developing demos of films, lectures and quizzes.

The e-learning course comprised modules supporting the learning of theoretical knowledge and rules related to authorization of judges. The judges need to know rules for how each exercise should be performed, kinds of equipments which are allowed, and rules for best result, selection of winners, jury, protests, and how to plan and arrange athletics meetings. The handbook for NFIF contains these regulations which are yearly adjusted at international congresses.

The system developer (SD) became the "knowledge broker" in the project and was responsible for communication with all the actors belonging to different communities and organizations participating in the project [19]. The project group had an initial meeting to make a project plan showing the project activities, milestones, and action points. The plan consisted of milestones for each actor and for each module which should be developed in the system. The SD utilized principles from a waterfall approach with stages of design, implementation and testing/evaluation, and used a project planning tool to continuously control the progress of the project. One important milestone was to complete a beta version of the LMS to demonstrate the system with its content at the National Championship of Athletic Sports in august 2010 and a final version of the system should be presented at FDU's yearly seminar in January 2011.

The system developer struggled to keep the project plan according to time schedule, and there were several delays as regards content of course material which should be loaded and customized into the LMS. There were also some misunderstandings related to the design obligations and the requirement specification (RS) for the LMS. The RS was not passed on to the SD, however, the SD got the information that customizing the user interface was not restricted by the RS and that the SD was given the complete responsibility to select the design. At a later stage in the project, the SD finally got the RS for the LMS which contained specific rules for customizing the content and interface. Because of missing information the SD had to redesign the LMS which required extra work. To get hold of learning material and content that were missing, the SD contacted actors outside the project team to get necessary information to complete the LMS according to the RS.

IV. INTERPRETING THE PROJECT FROM AN ANT PERSPECTIVE

This socio-technical context of this SD project described here provides an example of an Actor Network with several human and non-human actants. The context of the project was multidimensional and complex and the communication lines did not work smoothly. Unforeseen events took place, and the learning process consisted of conflicting understandings among the project team members in terms of the project plan, the RS, and the design of the LMS, its modules and content. Moreover, there was a lack of information to complete the LMS and its content inside the project team, and external actors were involved to support the finalization of the project.

By utilizing an actor-network perspective, the project unfolds a complex socio-technical environment, and it reveals how the learning processes for the human actors occurred. The transfer from a traditional classroom learning context to an online learning context was not easy. Despite a clear project plan, the SD had problems with controlling the actors and making a stable network.

Figure 1 depicts the socio-technical context of the project interpreted from an ANT perspective, and the different actants in

terms of the SD, FDU management, Company IT, RS, LMS content, LMS, regulations, handbook, project plan, and different tools. The figure illustrates alliances; 1) making the network unstable, and 2) stabilizing the network.

An ANT perspective can be useful to get a more fully understanding of all connections which make influence on the process in an ICT project. Additionally, an ANT perspective reveals conflicts, power relations, learning processes and how an unstable network alliance may create problems for completing a project. The LMS will influence on its stabilization.

V. CONCLUSIONS

This paper discusses the challenges encountered while a Norwegian sport federation of athletic judges intends to move from traditional classroom to an e-learning environment. In order to examine the relationship between human and technology and how their interactions in the development of a socio-technical system as a learning Management system, an Actor Network Theory approach has been adopted.

The underlying idea behind this approach was to attempt to answer the question of how social networks are created and maintained.

The method turned to be quite descriptive with insufficient details in presentation of the different actors involved in the network.

However, although it presents some shortcomings, ANT still proved to be a useful and helpful approach in clarifying the associations between different components of the network. Furthermore, the analysis illustrated the critical involvement of a technology in a social based context such as an e-learning environment.

While a complete ANT analysis has not been performed, this interpretation presented here, aims to exemplify the opportunities for using concepts and language from ANT.

Further studies of this network would provide more information about how the network develops over time, if it stabilizes, and how new judges and the usage of the LMS will influence on its stabilization.

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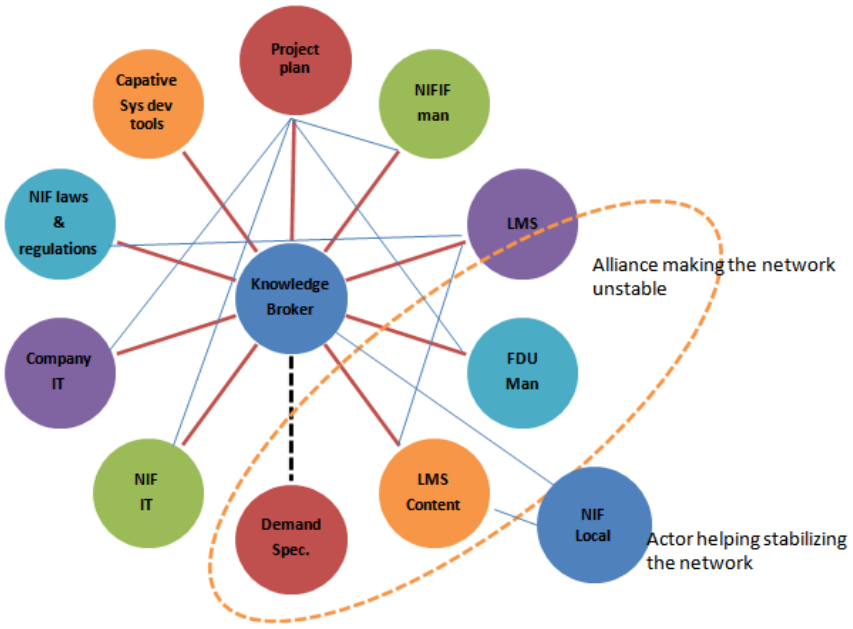

Fig. 1 The socio-technical context of the project interpreted from an ANT perspective

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